REMARKS/ARGUMENTS

Claims 8-11 and 14 are pending herein. Claims 8, 10, 11 and 14 have been amended hereby to correct minor matters of form and for clarification purposes only. Applicants respectfully submit that no new matter has been added.

Applicants respectfully submit that this Amendment is proper pursuant to Rule 116 because the claim amendments merely address minor matters of form which place this application in better condition for appeal, if necessary, and do not introduce any new issues.

1. Claims 8-11 and 14 were rejected under §103(a) over Chaudhari (technical article) in view of Balkus. Applicants respectfully traverse this rejection.

Independent claim 8 recites a mesoporous silica composite material comprising a porous substrate and a mesoporous silica deposited on the porous substrate. The mesoporous silica exhibits alkaline resistance, has uniform mesopores and a periodic structure and includes a Zr element in the form of a Si-O-Zr bond. The amount of Zr in the Si-O-Zr bond, represented by [Zr/(Si + Zr)], is in a range of 0.05 to 20 mole %.

As previously submitted in the September 20, 2004 Amendment, the entirety of which is incorporated herein by reference, Applicants respectfully maintain that the prior art of record fails to disclose or suggest the claimed mesoporous silica exhibiting alkaline resistance.

That is, Applicants first discovered that a Zr- including mesoporous silica having advantageously good alkaline resistance properties can be obtained when a Si source, a Zr source and a surfactant are initially mixed together, as starting materials, to form a synthesis gel. That is, a structurally distinct Zr- including mesoporous silica (i.e., one having suitable alkaline resistance) is obtained when the Si source and the Zr source are mixed together in a specific sequence, before the initial gel is formed, during the formation process.

On the other hand, Chaudhari discloses that a surfactant and a Si source are mixed together to form an initial synthesis gel, and that Zr is then subsequently added

to Chaudhari's initial synthesis gel mixture, which is thereafter processed to form a Zr-MCM-41 material. Applicants respectfully submit that Chaudhari does not disclose or suggest that any of the samples of Zr-MCM-41 shown in Chaudhari's Table 1, for example, have alkaline resistance properties, as claimed. In fact, Applicants respectfully submit that, based on the processing sequence actually disclosed in Chaudhari, skilled artisans would readily understand that Chaudhari's Zr-MCM-41 material does not necessarily exhibit alkaline resistance, as claimed. That is, because Zr is not provided together with Si before the initial gel is formed in Chaudhari, Applicants respectfully submit that Chaudhari's mesoporous silica would not necessarily have the alkaline resistance that is exhibited in the claimed mesoporous Si, which is obtained as a result of the sequence in which the Zr is introduced.

Again, since the PTO is relying upon Balkus only for disclosure of a substrate material, Applicants respectfully submit that even if Chaudhari's Zr-MCM-41 material were formed on the substrate disclosed in Balkus as asserted in the Office Action, the resulting product would not necessarily exhibit the claimed alkaline resistance property recited in independent claim 8.

Claim 14 is a dependent product-by-process claim reciting that the mesoporous silica of independent claim 8 is formed by mixing, as starting materials, a solution including a surfactant and at least one of (i) a solution including a Si source and a Zr source and (ii) a dispersion including a Si and a Zr source to form a gel, which is then further processed to produce the mesoporous silica. That is, claim 14 positively recites the processing conditions that Applicants discovered are responsible for imparting the claimed alkaline resistance properties to the claimed mesoporous silica.

On the other hand, as discussed above, Chaudhari discloses a synthesis gel that includes a Si source and a surfactant, but Chaudhari does not disclose or suggest that Zr should be added together with the Si before the initial synthesis gel is formed. Moreover, Applicants respectfully submit that Chaudhari does not include any teaching that would have led skilled artisans to believe that the Zr-MCM-41 material disclosed therein would necessarily have any alkaline resistance properties, much less

any disclosure that, contrary to the process sequence actually taught in Chaudhari, such an otherwise undisclosed alkaline resistance property would, or even could, be obtained if the Zr source were instead added before the initial formation of the synthesis gel.

In the Office Action, the PTO asserted that Applicants bear the burden of showing that the Zr-MCM-41 mesoporous silica of the prior art would not have the claimed alkaline resistance (see Office Action, page 4, lines 10-11). In response, attached hereto is the Rule 132 Declaration of Dr. Nobuhiko Mori, which includes experimental evidence showing that mesoporous silica formed using the process sequence according to Chaudhari would not necessarily have the claimed alkaline resistance property.

These experiments include a direct comparison between the alkaline resistance properties of mesoporous silica made by the processing steps according to the present invention (Experiment A) and the processing steps in Chaudhari, wherein the Zr source is not provided until after the initial synthesis gel is formed (Experiment B). The results of the experiments outlined in the Declaration show that mesoporous silica having alkaline resistance, as claimed, is obtained when Zr is added together with Si before the initial gel is formed, but not when Zr is added to the initial gel after the formation thereof, as taught by Chaudhari.

Applicants respectfully submit that the results show a clear difference in the alkaline resistance of the Experiment A samples and the Experiment B samples, which evidences that because Chaudhari's processing sequence is different from the sequence recited in claim 14, Chaudhari's mesoporous silica would not necessarily exhibit the claimed alkaline resistance property recited in claim 8. In view of the above, Applicants respectfully submit that the claimed mesoporous silica having alkaline resistance is clearly structurally and patentably distinct from that of the prior art of record.

For at least the foregoing reasons, Applicants respectfully submit that all claims pending herein define patentable subject matter over the applied references.

Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

April 27, 2005
Date

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SPB/NB/gmh

Attachments: Appendix A - Marked-up amended Table 1
Appendix B - Marked-up amended Table 2
Appendix C - Rule 132 Declaration (5 pages)

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Table 1

	Examples											
	1	2	3	4	5	6	7	8	9	10	11	12
Si source	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS	TEOS
	4.04	3.96	3.75	4.04	3.96	3.75	7.92	7.5	7.08	7.92	7.5	7.08
Zr source	TPOZ	TPOZ	TPOZ	TBOZ	TBOZ	TBOZ	TPOZ	TPOZ	TPOZ	TBOZ	TBOZ	RBOZ
	0.26	0.44	0.89	0.27	0.45	0.90	0.53	0.89	1.78	0.54	0.90	1.81
Zr/(Si+Zr)	0.03	0.05	0.10	0.03	0.05	0.10	0.03	0.05	0.10	0.03	0.05	0.10
Surfactant	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB	CTAB
	0.364	0.364	0.364	0.364	0.364	0.364	5.83	5.83	5.83	5.83	5.83	5.83
PH-adjusting agent	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH	NaOH
	2.5	2.5	2.5	2.5	2.5	2.5	5.0	5.0	5.0	5.0	5.0	5.0
Product	Zr-MCM-41	Zr-MCM-41	Zr-MCM-41	Zr-MCM-41	Zr-MCM-41	Zr-MCM-41	Zr-MCM-48	Zr-MCM-48	Zr-MCM-48	Zr-MCM-48	Zr-MCM-48	Zr-MCM-48
Mesopore diameter	2.6						2.8					
Mesopore volume	0.9						1.0					
[[Alkali]]Alkaline resistance	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5	pH 11.5

Appendix A - Amended Table 1

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Table 2

	Comparative Examples	
	1	2
Si source	TEOS	TEOS
	4.17	4.17
Surfactant	CTAB	CTAB
	0.364	5.83
pH-adjusting agent	NaOH	NaOH
	2.5	5.0
Product	MCM-41	MCM-48
Mesopore diameter	2.7	2.4
Mesopore volume	0.8	0.9
[[Alkali]]Alkaline resistance	Broken at pH 10	Broken at pH 10

Appendix B - Amended Table 2
VERSION WITH MARKINGS TO SHOW CHANGES MADE